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of the

Hawaiian Botanical Society

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c/o *DEPARTMENT OF BOTANY*
UNIVERSITY OF HAWAII
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SPECIAL SUBJECT

F E R A L A N I M A L S

In this issue of the NEWSLETTER, the usual Principal Paper has been left out. Instead, the space is being directed to hooved, feral animals. In the sense intended here, feral should be understood to include both wild animals which have been introduced to Hawaii and the descendants of escaped domestic animals. Although other kinds of introduced animals, such as mongooses, rats, mice and cats are capable of causing much injury to indigenous flora and fauna, the present discussion and reports deal only with hooved herbivores.

Our current concern with the impact caused by hooved animals upon native vegetation, and indigenous biota in general, reflects three almost unrelated situations:

1. The question of whether the National Park Service should "manage" feral goats as a resource or attempt to eradicate them from Hawaii Volcanoes National Park. This is a policy matter which the National Park Service, a federal agency, has full authority to settle. This is not a situation parallel to certain instances on the mainland where "refuges" have been established for feral horses and burros because of their association with the opening of the West.

2. The question of whether the Hawaii Division of Fish and Game should be required to introduce axis deer to a large enclosure experimentally on Mauna Kea with the long-term objective of releasing these creatures for sport hunting. This is tied in with State legislation. The State has the responsibility and authority to settle this matter.

3. The question of whether the Molokai Ranch Company should be allowed to introduce, experimentally, breeding stock of nine kinds of African big game animals for sport hunting. The Hawaii Board of Agriculture issued a permit to the Company on

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March 24, It will not be easy to have this permit rescinded. In this instance, also, the responsibility and authority rests with the State.

We call to the attention of readers that rules for introduction of mammals, birds, and reptiles to Hawaii are different for private individuals and corporations than for the Hawaii Division of Fish and Game. With the notable exception of certain creatures such as snakes, which are flatly prohibited by law, the principal restraints upon introductions by private land owners are quarantine regulations administered by the Hawaii Department of Agriculture. In great contrast, proposed introductions by the Division of Fish and Game are governed by a Commission appointed for this purpose by the Governor under a 1970 law as well as by the quarantine rules. Thus, it is easier for private individuals than for the State's principal wildlife agency to bring in new animals.

The axis deer that were destined for Hawaii, which the Division of Fish and Game had captured, vaccinated, tested for brucellosis, and kept in a holding pen on Lanai have been killed by dogs according to a news report dated 25 March, 1972. Thus, the possibility of a release on Hawaii in the immediate future has been lessened.

It may be worth reminding readers, from both the "pro" and "con" persuasions, that this is not a simple example of the good guys versus the bad guys. However much one may disagree with the opinions of the opposition, please remember that such differences may be equally honest. Some examples follow which reflect sincere although differing points of view. Also, remember that the animals in question are quite innocent of any malicious intent and do not deserve dislike because of their food habits. Unlike you and me they did not ask to come here.

1. From a letter to the Editor, Honolulu Star-Bulletin, March 1, 1972 --

" SIR: I would like to see axis introduced into Hawaii.

"As a former, longtime animal-watcher, I lament the death of wild animals in our State. We have only mongooses, rats, mice, and bats, Our pigs, goats, and sheep are only feral, i.e. domestic animals gone astray.

"In the summertime vacation, my wife and I are privileged to have such wild animal neighbors in the forest surrounding our log cabin in northwest Ontario, Canada: White-tailed deer, beaver, chipmunks, red-striped squirrels, flying squirrels, white-footed mice, shrews, voles, bats, varying hares, marmots, skunks, red foxes, otter, muskrats, mink, weasels, timber wolves, moose, fishers, martens, bob cats, black bears, lynxes, and occasionally wolverines and porcupines.

"The introduction of axis deer would improve Hawaii's present imbalance of nature. We now hold the doubtful distinction of having the least wild animal life among the 50 states."

Parenthetically, we wish to comment that a member of the Hawaii Audubon Society issued a lengthy, carefully prepared rebuttal which was published on March 10.

2. In Technical Report No. 2, Hawaii Subprogram of the International Biological Program, pp. 201-202, January 2, 1972, Dr. F. R. Fosberg, Adviser for Tropical Biology, Smithsonian Institution, Washington, D. C. and Honorary Associate in Botany, Bishop Museum, Honolulu, said in part,

"I have been asked for my considered scientific opinion of the advisability of the proposed introduction of axis deer on the Island of Hawaii.

"Scientifically this introduction is indefensible. All previous experience shows that the inevitable result of the introduction of 4-footed animals on an oceanic island is degradation of the ecosystem, loss of vegetation and soil and of the animals which depend on these. The delicately balanced relationships between plants, animals, soil and water on an island evolved in the absence of terrestrial non-flying mammals."

3. A letter from a representative of Molokai Ranch to the Department of Agriculture concerning the application to import several species of animals included --

"Attached is a letter agreeing to destroy any animals leaving the confines of Kaluakoi.

"A combination of release pens, existing stockproof fences and natural boundaries will be used to keep these animals within the boundaries of Kaluakoi, (Tax key 5-1-02, Parcels 014 & 01).

"As the primary purpose of these importations at this time will be to conduct range use studies, it is our intention to have these animals living among our cattle."

4. A big island rancher's letter included --

"It is our firm belief that to satisfy a few so-called sportsmen you will expose a great deal of land to unnecessary overgrazing. This has proven true in the past with the wild goats, sheep and pigs that now roam our mountainsides. There is also a good chance that cane and other croplands will be damaged by browsing deer if established in Hawaii."

5. A member of Hawaii's delegation to the U. S. Congress --

"Opposition to goat eradication in our national park system in Hawaii comes from hunters. Those of us who want to protect additional areas of Hawaii by conferring park status, must confront this reality. Hunters in the past have defeated park extension proposals.

"It seems to me that the task of conservationists is to persuade the local people of Hawaii to support this cause. A citizens consensus would be extremely helpful, and I ask that you lend any assistance you can toward realizing this objective."

Sign Up!

The letters and petitions on goats, deer and the greater kudu filling our newsletter show how seriously the Hawaiian Botanical Society regards damage by vertebrate herbivores to this archipelago's delicately balanced native ecosystems and many rare species.

Members who have not already done so, are urged to sign the enclosed petition opposing the proposal for placement of deer on the Big Island for the benefit of the small percentage of our population that wants to hunt them. Tear it out and send the signed petition to the address given on the reverse side, (P. O. Box 5032, Honolulu, Hi. 96814). Those who prefer to write letters of protest should address them to Mr. Ronald J. Endrizal, Chairman, Animal Species Advisory Commission, Suite 503, 33 S. King Street, Honolulu, Hawaii 96813. It is hoped that this Advisory Commission will be enlarged during the present Legislative Session to include more scientific specialists, especially plant ecologists, and also be given authority to advise on all non-governmental proposals to liberate exotic animals, such as the recent proposal of Molokai Ranch Co.

The many groups and individuals working on the axis deer issue can bring about what may prove to be the defeat of this ill-advised proposal once and for all!

Steve Montgomery
Committee on Vertebrate Herbivores

More "Degener on Deer".

"In 1928 West Molokai about Mauna Loa had considerable patches of dense, dry forest, the trees badly browsed by axis deer and the tender seedlings eaten or trampled to death. At that time I collected vouchers for preservation of such beauties as the native gardenia, naio, the golden-leaved keahi, lama or Hawaiian kaki, cotton-leaved nehe, kolea with pinkish leaf buds, the fragrant-flowered coffee relative alahee, ahakea, the red-flowered wiliwili, the Hawaiian olive or olopua, etc. A visit to the precise spot in January 1960 was surprising: no trace remained of the forest except for a few wiliwili trees (the trunks and twigs bear black thorns) and a single alahee! According to a Hawaiian already old in 1928, he and his late father many years before had used cane knives to penetrate the jungle of shrubs, trees and ieie vines growing in this vicinity. I believe this story as the general area is sprinkled here and there with recently fossilized land shells that must have had dense, moist undergrowth in which to live. In summary the original dry forest of West Molokai has been wiped out by axis deer during the last twenty to thirty years.

"In 1964 Lanai about Kanepuu was still a beautiful dry forest where axis deer took cover from hunters and the sun, and freely wandered along their own well-worn trails nibbling twigs and trampling native seedlings. Mrs. Degener and I botanized here extensively. This is the island on which the late George C. Munro (1866-1963) spent twenty years as rancher and then manager. To facilitate our making a representative collection of Lanai plants, Mr. Munro sent us a list of the species he had collected in Kanepuu up to 1930. Of his 41 species (a set of Kanepuu plants is in the Bishop Museum as proof), we found only one third remaining!"

Resolution Regarding Goats in National Parks in Hawaii

On April 5, 1971, the Hawaiian Botanical Society adopted a resolution requesting "that the Park Service administrators institute an effective program of feral goat eradication" in National Parks in Hawaii. The intent of this resolution was to point out that the Society was convinced that only by total elimination of feral goats in Hawaii's National Park would the National Park Service be able to carry out its primary goal of protection of the native plant and animal species in the parks, and permit the restoration of the parks to reasonably pristine conditions in which they could be maintained. Senator Fong also asked the National Park Service to implement the goat eradication program and is "pursuing this matter with the purpose of obtaining sufficient funds in the fiscal 1973 Interior appropriation" (letter to Dr. P. Q. Tomich, Dec. 23, 1971).

The Director of the National Park Service, however, has again stated that "it is not our intention to eliminate goats from the Hawaiian national parks", (Nat. Parks and Conservation Mag., Nov. 1971, Vol. 45, No. 11, p. 35). Moreover, Congresswoman Patsy T. Mink (letter to Dr. P. Q. Tomich, Dec. 29, 1971) and Governor John A. Burns (letter to Mr. C. G. Kaigler, Feb. 4, 1972) have indicated that they favor "control" rather than "eradication" of goats in Hawaii's National Parks. Justification for this stand seems to be based on a statement which appeared in a book by F. Fraser Darling

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(tear out this page if you wish to turn in signatures)

PETITION
TO

THE STATE OF HAWAII BOARD OF LAND AND NATURAL RESOURCES, SUNAO KIDO, CHAIRMAN

It is understood that during its 1972 deliberations the Board of Land and Natural Resources may soon be considering the proposal to liberate Axis Deer on the Island of Hawaii.

We, the undersigned people, of all Hawaii, are firmly convinced that for various reasons, both economic and ecologic, the liberation of Axis Deer on the Big Island would definitely not serve the best interests of our State.

We, therefore, urgently and respectfully request the Board of Land and Natural Resources to disapprove the impending proposal to liberate Axis Deer on the Island of Hawaii.

NAME	ADDRESS

AXIS DEER TO THE BIG ISLAND??

A PROPOSAL HAS BEEN MADE THROUGH THE STATE DIVISION OF FISH AND GAME THAT AXIS DEER BE INTRODUCED TO THE BIG ISLAND AS A GAME ANIMAL TO BE SHOT BY HUNTERS. ONCE INTRODUCED IT WILL NOT BE FEASIBLE TO ELIMINATE THESE DEER, AND DISADVANTAGES AND DAMAGE WOULD BE OVERWHELMING COMPARED TO POTENTIAL BENEFIT TO A FEW INDIVIDUALS.

IRREPARABLE DAMAGE TO NATIVE PLANTS & BIRDS

AXIS DEER WILL DESTROY TREES, SHRUBS, AND HERBS BY BROWSING AND TRAMPLING. WE POSSESS A UNIQUE NATURAL HERITAGE IN THE MANY PLANTS FOUND ONLY HERE; IT IS SCIENTIFICALLY DOCUMENTED THAT LARGE ANIMALS LIKE DEER ARE DEVASTATING TO VEGETATION OF OUR ISLANDS. NATIVE FORESTS ARE THE REFUGE OF THE WONDERFUL NATIVE BIRDS, AND DAMAGE TO FORESTS BY DEER WILL DESTROY THE BIRDS' ONLY HABITAT. DEER WOULD INVADE HAWAII VOLCANOES NATIONAL PARK AS WELL AS OTHER NATURAL AREAS.

DESTRUCTION OF AGRICULTURE

AXIS DEER WILL NOT BE PRACTICALLY EXCLUDED FROM LARGE AREAS BY FENCING AND WILL DAMAGE CANE PLANTATIONS, FORAGE CROPS, ORCHARDS, NURSERIES, AND TRUCK CROPS. BESIDES CAUSING IMMEDIATE LOSS, THEY WILL SERIOUSLY THREATEN THE STATE'S FUTURE ECONOMIC GROWTH BY PLANNED DIVERSIFICATION OF AGRICULTURE.

CARRYING TRANSMISSABLE DISEASES

AXIS DEER WILL FORAGE AMONG DOMESTIC HERDS, COMPETING FOR FOOD, AND SERVE AS POTENTIAL RESERVOIRS AND DISSEMINATORS OF DISEASES THEY SHARE WITH CATTLE AND OTHER LIVESTOCK. DEER CARRY TUBERCULOSIS, UNDULANT FEVER, LEPTOSPIROSIS, ANAPLASMOSIS, PARASITIC WORMS, AND OTHER DISEASES AFFECTING CATTLE AND SOME TRANSMISSABLE TO MAN. SOME OF THESE DISEASES ARE NOW IN HAWAII AND COULD SOON BE SPREAD BY DEER: OTHERS WOULD BE FAR MORE DIFFICULT TO CONTROL AND IMPOSSIBLE TO ERRADICATE IF INTRODUCED IN THE PRESENCE OF DEER.

WHO BENEFITS

AXIS DEER WILL SERVE AS TARGETS FOR THE SMALL FRACTION OF HAWAII'S POPULATION THAT WILL HUNT THEM - LESS THAN ONE PERCENT. THIS WOULD BE SLIGHT COMPENSATION FOR THE GREAT LOSS TO OUR WHOLE STATE! FURTHERMORE, AXIS DEER ARE PRESENT ON THE ISLANDS OF MOLOKAI AND LANAI AND HUNTERS CAN SHOOT THEM THERE; DEER DAMAGE TO THE ENVIRONMENT IS SIGNIFICANT ON THESE ISLANDS, BUT FORTUNATELY LESS THAN IT WOULD BE ON THE BIG ISLAND. THOSE AGAINST THE PROPOSED INTRODUCTION INCLUDE AGRICULTURISTS, RANCHERS, CONSERVATIONISTS, NATURALISTS, SCIENTIFIC SPECIALISTS, AND MANY OF THE STATE'S OTHER CITIZENS.

THE INTRODUCTION OF AXIS DEER TO THE BIG ISLAND WOULD BE A DESTRUCTIVE ACTION THAT IS BIOLOGICALLY WRONG, UNSCIENTIFIC, AND ECONOMICALLY WASTEFUL.

BLOCK AXIS DEER INTRODUCTION

SEND THIS PETITION TO:

CITIZENS AGAINST AXIS DEER INTRODUCTION
P. O. BOX 5032
HONOLULU, HAWAII 96814

and Noel D. Eichhorn in 1969 ("Man and Nature in the National Parks. Reflections on Policy. 2nd ed. The Conservation Foundation, Washington, D.C.). In this book, on pp. 66 and 67 the following statement is made:

> "...But what of the grass? In the absence of goats to eat it, the grass will grow long and wither and become a fire hazard to the forest above. Possibly, lacking any better animal (and God forbid the rabbit!) there is an optimum population of goats which would subsist by keeping down the grass without having to go up to the fringes of the forest. If an ecological study supported such a view, the goat in severely pruned numbers in this particular situation would not be an altogether harmful exotic..."

Results of recent research in Hawaii would suggest that even small numbers of goats constitute a much more significant threat to native Hawaiian plants than do introduced grasses. For example, studies with goat-proof exclosures conducted by staff members at Hawaii Volcanoes National Park demonstrate significant increases in both numbers of individuals and numbers of species of native plants in areas from which goats are excluded. In such cases the native plants were able to grow even when exotic grasses were present, and it can be suggested that the exotic grasses may eventually be crowded out by the native species if there is no interference from goats or other browsing mammals. The results of a recent study (Günter Spatz and Dieter Mueller-Dombois, 1972. The influence of feral goats on koa (Acacia koa Gray) reproduction in Hawaii Volcanoes National Park. Technical Report No. 3, Island Ecosystems IRP, U. S International Biological Program, 16 pp.) on the effects of goats on koa reproduction indicate that, although reduction of goats would allow maintenance of koa in the mountain parkland ecosystem on Mauna Loa, "the goats will have to be exterminated and the whole area must be fenced" if recovery of this area "by native plants is to be continued to achieve a stable natural balance". The report states further: "Koa can find right reproductive circumstances only when the goats are removed totally."

In light of such evidence, the following resolution is offered:

WHEREAS ecological studies indicate that even small populations of goats may have drastic effects on native Hawaiian plants; and

WHEREAS no studies have yet shown that goats play any beneficial role in maintaining stability in natural Hawaiian ecosystems; and

WHEREAS a primary goal of National Parks is the protection of native plant and animal species under pristine conditions;

NOW THEREFORE BE IT RESOLVED that the Hawaiian Botanical Society at its meeting on March 6, 1972, again urges the National Park Service to institute immediately an effective program of feral goat eradication in National Parks in Hawaii; and

BE IT FURTHER RESOLVED that copies of this document be sent to officials of the National Park Service, to Governor Burns, and to Senator Fong, Senator Inouye, Congressman Matsunaga, and Congresswoman Mink.

Is History Repeating?

A recent letter from Kazimierz Wodzick, formerly Director, Animal Ecology Division, D.S.I.R., New Zealand and now an honorary lecturer in Zoology, Victoria University, Wellington, recalled that he had written, April 17, 1951, to Vernon Brock, Director of

Fish and Game, Hawaii Division of Fish and Game in reply to a letter from Mr. Brock dated March 7, 1951, on the same question!

"Problems related to the introduction of the Axis Deer to various islands of Hawaii are not new to me. On 7 March 1951, Mr. Vernon Brock, the then Director, Division of Fish and Game wrote to me on this subject (Encl. 1). His attitude "towards this situation (i.e. moving deer to the Island of Hawaii) has been rather negative thus far, largely because a firm factual basis for decision has been lacking." In my reply to the Director, Division of Fish and Game, State of Hawaii of 17 April 1951 (Encl. 2) I concluded "It is realized that the introduction of an exotic species may provide sport for a few and that in a generation time one may still have game, but at the cost of the final disappearance of native vegetation."

"Over twenty years have elapsed since the above mentioned letters were written and again a small group of influential people with vested interests is battling against the ideas, scientific evidence and interests of the remaining population of the island. I must confess that the above two letters made unhappy reading because after a score of years we are exactly where we have been before and one wonders whether it is at all serving a useful purpose to provide further evidence in the same matter as twenty years ago!

"However, it is fortunate that these last twenty years have brought a vast array of new and reliable observations and today it would be hardly relevant to state that "a firm factual basis for decision has been lacking.

"Admittedly, Axis Deer did not establish itself in New Zealand but in New Zealand eight other species of deer became acclimatized (see Wodzicki K. 1950, The Introduced Mammals of New Zealand, An Ecological and Economic Survey, Wellington, D.S.I.R. Bull. No. 98, 250 pp.) and their browsing and grazing effect is not unlike that of the Axis Deer. Although the New Zealand rain forest differs from that of the Islands of Hawaii, the evolution of the two types of forest have been similar, if not identical as both forests have developed in the absence of browsing animals. Although the evidence advanced below pertains to New Zealand, it will be obvious to the attentive reader that a good deal, if not most of the evidence available, is relevant to Hawaiian conditions.

"I regret that lack of time does not allow for a fuller presentation of the considerable amount of evidence on the effect of browsing animals on the New Zealand native forest, on its soils and on its native animals that has been accumulated by botanists, Zoologists, pedologists, and foresters. I am also aware that your time and that of the members of your Commission is limited and for this reason I shall restrict myself to mention one recent publication only by a prominent wildlife man and a world-wide known scientist, Professor Walter E. Howard, the University of California, Davis. Dr. Howard visited New Zealand at the request of the New Zealand Government "to serve as an ad hoc committee of one 'to become familiar with the wild animal situation in protection forests and with the past and current research affecting the management of these animals, and make recommendations to the Department of Scientific and Industrial Research and New Zealand Forest Service for future research programme aimed at improved control'". A copy of Dr. Howard's report (Howard, W.E., 1966, Control of Introduced Mammals in New Zealand. D.S.I.R. Inform. Bull. No. 45, 96 pp.) is being forwarded to you by second class airmail.

"While the whole report is pertinent to the matter being considered by your Commission I would particularly draw your attention to the chapters "Vegetation" (p. 42-51) and the "Synopsis of Forest-wildlife Relationships" (pp. 53 to 60) and

accompanying illustrations. With this evidence on hand it would certainly be a great pity if the mistake that occurred in New Zealand over a century ago, would be repeated in your islands at present."

Protest to Introduction of Game Animals to Molokai

The Executive Board decided on March 21, 1972 to draft a letter to the Animal Advisory Committee of the Department of Agriculture. The letter outlined our specific objections. Unfortunately, the Board of Agriculture met and granted approval for the introduction before the letter was received.

A New Strategy on Goats in National Parks

At the Botanical Society meeting on April 3, a motion was made and passed to report our views on the above subject to the Royal Society and the Linnean Society with the request that these organizations make representations to the U. S. Department of State. This motion was proposed by C. H. Lamoureax at the suggestion of R. Melville, Royal Botanic Gardens, Kew, Richmond, Surrey, England.

SOCIETY BUSINESS

March 6, 1972

a. Resolution on feral goats (see Special Subject Dept.)

b. Resolution on Ala Moana Park.

c. Freda Shiraki was recognized for her work on the Ala Moana Park Committee (Given a copy of "In Gardens of Hawaii".).

d. Constance Hartt elected trustee of Marie C. Neal Memorial Fund to replace A. C. Smith, resigned, moved out of State.

e. Ruth Gay elected Trustee of Marie C. Neal Memorial Fund in ex-officio capacity.

f. Speakers of evening, Dr. LeRoy Holm and Dr. Juan Pancho, The World's Weeds, Their Biology and Distribution.

April 3, 1972

a. Motion to present our views on goats in National Parks to Royal Society and Linnean Society--passed.

b. Notice that Executive Board will meet 18 April, room 159, Harold St. John Plant Science Building.

c. Plans for exhibit in State Fair next summer are being made by Ron Hurov and Jim Barrows.

d. Speaker of evening, Don Reeser, Park Naturalist, Hawaii Volcanoes National Park, "Feral Animals versus the Flora of Hawaii Volcanoes National Park".

Dues Are Due

If your dues to the Hawaiian Botanical Society are not paid up for the current year, please settle up with the Treasurer, Ercell C. Woolford, 3797-A Sierra Dr., Hon., HI. 96816. See back cover, this issue for rates.

HAWAIIAN BOTANICAL SOCIETY

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THE HAWAIIAN BOTANICAL SOCIETY was founded in 1924 to "advance the science of Botany in all its applications, encourage research in Botany in all its phases," and "promote the welfare of its members and to develop the spirit of good fellowship and cooperation among them." Any person interested in the plant life of the Hawaiian Islands is eligible for membership in this Society. Dues; regular, $5.00 per year; family, $7.50; college students, $2.00; students below college level, $1.00.

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